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(19) (CA) **CANADIAN PATENT** (12)

(54) Smoke Detector Indicator

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#### ABSTRACT OF THE DISCLOSURE

A smoke detector indicator for a fire alarm system is disclosed. The indicator system permits the audio alarm to be turned off for false alarm situations, but has a visual indication that the system is not in operation. In a system including a circuit connecting a smoke detector, battery and an audio alarm, all in a single enclosure, the improvement comprises a switch in the circuit to open the circuit and prevent the alarm from sounding, and a visual indicator associated with the switch, visually apparent when the circuit is open, and not visually apparent when the circuit is closed.

SMOKE DETECTOR INDICATOR

The present invention relates to smoke detectors, and more particularly to a device that turns off a smoke detector, but gives a visual indication that the detector has been turned off.

5       The majority of households are today fitted with smoke detectors of one type or another. Perhaps the most common smoke detector is a simple battery operated unit which is generally mounted on the ceiling in a passage, hallway, staircase or the like, in a location where there is at least  
10       a partial air flow so that if a fire does occur smoke will be monitored by the smoke detector, and a signal given. Most smoke detectors have a horn or a buzzer which sounds when the smoke is detected. The detector system may include ionization type detectors to detect smoke or gas, as well as heat  
15       detectors which sound the alarm when a preset temperature is reached. The battery ensures that the detector operates even in the event of a power failure.

      These types of smoke detectors are sold in hardware stores, department stores and the like, and some households have two or three units at different locations in the  
20       house, apartment or living areas. Hotels, offices and public buildings usually have multiple units with monitoring heads in different rooms, however, the present invention relates more to a single smoke detector battery operated unit,  
25       rather than a multiple unit.

      One problem that exists with the single unit smoke detector and is apparent in households, is the difficulty in resetting the smoke detector alarm after it has gone off due to a false signal. False signals occur from time to time  
30       primarily when cooking occurs, for instance, burnt toast can produce sufficient smoke to set off a smoke detector, deep frying cooking can also set off an alarm as well as other types of cooking that occurs regularly in a household.



Once the alarm on the smoke detector commences, it can continue for up to a half hour before the mechanism of the detecting device resets itself. Thus the household has to put up with this alarm for as long as a half hour, and this is generally considered intolerable. In most cases householders disconnect the smoke detector, and this has to be done by climbing up and disconnecting the battery from the smoke detector in the ceiling. Whereas there is an incentive to climb up and disconnect the battery, because of the noise from the detector itself, once the battery has been disconnected it is often forgotten and not reconnected. Therefore, the smoke detector is inoperative and stays in that condition until someone remembers to reconnect the battery. Thus, the whole purpose of a smoke detector is destroyed because it has been disconnected for a false alarm and then not reconnected.

The purpose of the present invention is to provide an indicator wherein a smoke detector is disconnected temporarily, and when it is in the off position a visual indicator clearly shows that it is disconnected. When the particular smoke condition that triggered the alarm is dispersed, the indicator can be clearly seen, and the smoke detector reconnected.

The present invention provides in a fire alarm system including a circuit connecting a smoke detector, a battery and an audio alarm, all in a single enclosure, the improvement comprising a switch in the circuit to open the circuit and prevent the alarm from sounding, and a visual indicator means associated with the switch, the indicator means being visually apparent when the circuit is open and not being visually apparent when the circuit is closed.

In a preferred embodiment of the present invention the visual indicator means includes a visible probe, the enclosure has an aperture therein with the switch directly above the aperture. The probe fits into the aperture and activates the switch to open the circuit, the enclosure having

retaining means to hold the probe in the aperture, thus leaving the circuit open and means to remove the probe from the aperture to deactivate the switch, thus closing the circuit. The enclosure is preferably ceiling mounted and the aperture is  
5 a key slot and the probe is retained in the slot by being rotated.

In other embodiments the visual indicator means includes a light associated with the circuit, the light being on when the circuit is open, and off when the circuit is closed. The light and the switch may be remote from the  
10 enclosure. In one embodiment, the light and switch are included in the enclosure, and the switch has an operating lever that may be activated by a hand held rod or the like. In another embodiment the switch is a two pole switch and the light is powered by the building power supply. In yet a  
15 further embodiment a battery charging device may be included to charge the battery of the system, and in a still further embodiment a timer may be included in the circuit so that when the switch is activated to open the circuit, the timer runs for a preset time and then automatically closes the  
20 circuit.

In drawings which illustrate the embodiments of the invention,

Fig. 1 is a schematic side view of a smoke detector with a visual indicator probe to deactivate a switch in the  
25 smoke detector circuit.

Fig. 2 is a partial schematic side view of the detector shown in Fig. 1 showing the probe inserted through a slot in the casing of the detector.

Fig. 3 indicates the key-hole slot in the casing of  
30 the detector of Fig. 1.

Fig. 4 is a schematic diagram of a smoke detector having a light indicator therein.

Fig. 5 is a partial schematic of the drawing shown in Fig. 4 including a timer switch.

35 Fig. 6 is a schematic diagram of another embodiment

of the present invention.

Fig. 7 is a schematic diagram of the ceiling mounted detector having a large operating lever.

Fig. 8 is a schematic diagram of another smoke  
5 detector having a battery charger incorporated in the circuit..

Referring now to the drawings, Figs. 1, 2 and 3 illustrate a ceiling mounted fire alarm system 10 within a container 11. The system 10 has a circuit 12 with a battery  
10 13 therein connecting to a smoke detector 14 having an audio alarm 15. A switch 16 is included in the circuit 12, when the switch is closed the circuit is closed and any smoke that is detected by the smoke detector 14 causes the alarm 15 to sound. A probe 18 having a visual indicator panel 19 at the  
15 bottom thereof and a post with a T-section 20 at the top, passes through an aperture such as key hole slot 21 as shown in Fig. 3 on the underside of the container 11. The probe 18 is inserted through the slot 21 as shown in Fig. 2 with the T arranged to pass through the slot. The top of the probe 18  
20 opens the switch 16 and then by rotating the probe 18 through 90°, the T-section 20 rests on the container 11 and holds the switch 16 open. In another embodiment the probe 18 may have a groove (not shown) at its end which when pushed into the aperture in the container 11 retains the probe 18 in place  
25 by a spring clip (not shown) in the container 11. A further push upwards on the probe 18 releases the spring clip and the probe 18 can be removed, closing the circuit 12.

The visual indicator panel 19 may be clearly seen hanging from the smoke detector container 11. The visual  
30 indicator panel 19 may be painted red or, alternatively, may have a red ribbon or other device which is visually apparent. The panel may extend down practically to head height, the important point being that the panel is easily visible so that those in the house will know the circuit 12 is switched  
35 off and the smoke detector is not in an operable mode. After

a false alarm when the smoke in the house from cooking or the like has decreased a sufficient amount so that the audible alarm 15 does not sound, it is merely necessary to rotate the indicator 18 and drop it out of the slot 21, so that the switch 16 makes contact and the smoke detector is once again in the operable mode.

Another embodiment is illustrated in Fig. 4 including an indicator light 40 with a separate circuit 41 so that when the switch 16 is in the open position, it closes the circuit 41 and the indicator light 40 is energized. The indicator light 40 is preferably a red light or coloured light so that it stands out from normal household lighting. The indicator light 40 and switch 16 are located in a remote housing 42, preferably on the wall, or at some location which is clearly apparent to someone entering or passing through the household, so that the indicator light 40 clearly shows that the smoke detector circuit 12 is in the non-operable mode. Another embodiment of this system is illustrated in Fig. 5 which includes a timer switch 50 connected to the switch 16. The timer switch is preset so that when one opens the circuit 12 to place the smoke detector in the non-operable mode, the switch stays open for a preset time and then automatically closes. The timer switch is the type used for lights and is preferably of the wind-up kind, namely one that is rotated to the desired time and then unwinds slowly, similar to a kitchen-style timer. In another embodiment an electric timer may be used, either set at a particular time period, for example 20 minutes, or allowing for an adjustable time period.

A double pole switch 60 is shown in Fig. 6 which is a similar circuit to Fig. 4, however, the double pole switch 60 allows the light 40 to be powered by a standard AC circuit from the household power system, so the light can be considerably brighter than a battery powered light.

A ceiling mounted unit is illustrated in Fig. 7 having a circuit similar to that shown in Fig. 4 with an



indicator light 40 integral with the unit. A special switch 70 has two positions, a first position which closes the circuit 12 for the smoke detector 14 and a second position which opens the circuit 12 and closes the circuit 41 for the indicator light 40. The switch 70 has a long operating lever 71 with an aperture 72 at the end of the lever 71. A hand held rod such as a broom handle or the like may be inserted into the aperture and the lever moved to open or close the circuit 12. It is apparent that when the smoke detector circuit 12 is closed and the smoke detector is in the operable mode, the light 40 is turned off, however, when the switch 70 is moved and the smoke detector circuit 12 is in the non-operable mode, then the light 40 is switched on.

Another embodiment is shown in Fig. 8 which is similar to that shown in Fig. 4, but with the addition of a battery charger circuit 80 so that the unit can be connected up to 115 volt AC household supply, thus avoiding the necessity of having to replace the battery. The battery 13 is of the type that is chargeable, rather than a standard dry cell, thus the smoke detector circuit operates regardless of whether there is an interruption in household power.

Various changes may be made to the scope of the present invention, which is limited only by the following claims.

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The embodiments of the invention in which an exclusive property or privilege is claimed, are defined as follows:

1. In a fire alarm system including a circuit  
5 connecting a smoke detector, a battery and an audio alarm, all in a single enclosure, the improvement comprising:  
a switch in the circuit to open the circuit and prevent the alarm from sounding, and  
a visual indicator means associated with the switch,  
10 the indicator means being visually apparent when the circuit is open, and not being visually apparent when the circuit is closed.
2. The fire alarm system according to claim 1, wherein the visual indicator means includes a visible probe,  
15 the enclosure has an aperture therein with the switch directly above the aperture, the probe fits into the aperture and activates the switch to open the circuit, the enclosure having retaining means to hold the probe in the aperture thus leaving the circuit open, and means to remove the probe from  
20 the aperture to deactivate the switch thus closing the circuit.
3. The fire alarm system according to claim 2 wherein the enclosure is ceiling mounted, the aperture is a key slot and the probe is retained in the slot by being rotated.
- 25 4. The fire alarm system according to claim 1 wherein the visual indicator means includes a light associated with the circuit, the light being on when the circuit is open and off when the circuit is closed.
5. The fire alarm system according to claim 4 when  
30 the light and the switch are remote from the enclosure.
6. The fire alarm system according to claim 4 when the light and the switch are included in the enclosure, and wherein the switch has an operating lever that may be activated by a hand-held rod or the like.
- 35 7. The fire alarm system according to claim 4

wherein the switch is a two pole switch and the light is powered by household power supply.

8. The fire alarm system according to claim 4 including a battery charging device to charge the battery of the system.

9. The fire alarm system according to claim 4 including a timer connected with the switch, so that when the switch is activated to open the circuit, the timer is set to close the circuit after a preset time.

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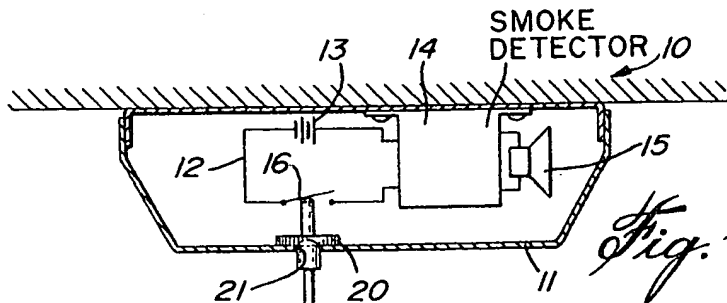
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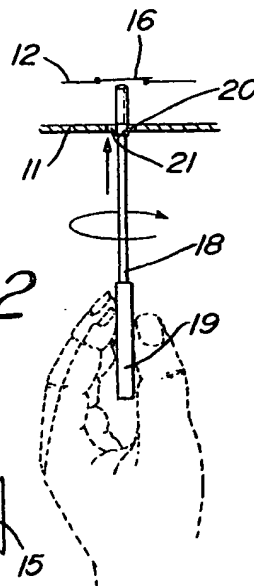
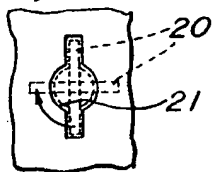
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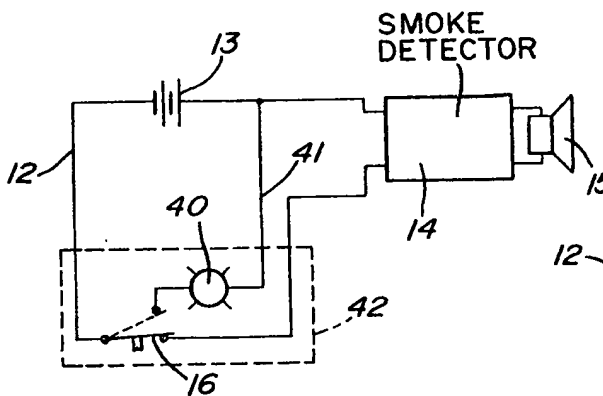


*Fig. 1*

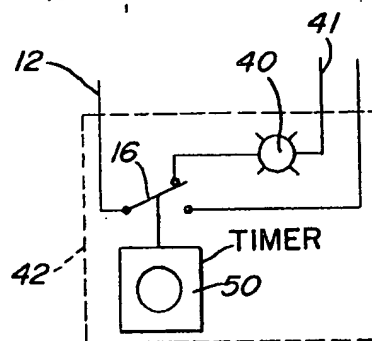
*Fig. 3*



*Fig. 2*



*Fig. 4*



*Fig. 5*

